

APPENDIX A

PDP-10 Equipment List

Processor and Processor Options			
KA10	ARITHMETIC PROCESSOR: central processing unit for all PDP-10 systems with floating point and byte manipulation instructions and including: - 300 character/second photoelectric paper tape reader - 50 cps paper tape punch - 10 cps console teleprinter, LT35A (LT37 furnished when available) - functional operator console - multiplexed Input/Output Processor (IOP) with seven levels of priority interrupt - real time clock	MD10E	CORE MEMORY EXPANSION MODULE: 32,768 words, 1.80 μ s cycle time. Up to three may be added to each MD10.
		BS10A	ADDITIONAL MEMORY CABLE SETS: for the MD10.
		DF10	DATA CHANNEL: permits data transfers between high speed devices and core memory. It will service up to eight high speed devices such as RC10, RB10, and RP10.
KM10	FAST REGISTERS: sixteen 36-bit integrated circuit registers used as multiple accumulators and/or index registers and for highly iterative program loops. Replaces the first 16 locations of main core memory.		
KT10A	DUAL MEMORY PROTECTION & RELOCATION REGISTERS: provide multiprogramming hardware for automatic protection and relocation of reentrant and non-reentrant code. (Required for time-sharing.)		
		Disk Systems	
		RC10	SWAPPING DISK CONTROL: provides control for up to 4 RD10 disk files. It connects to the DF10 data channel which provides a direct path to memory and requires at least one RD10.
		RD10	SWAPPING DISK FILE: stores 512,000 36-bit words. Average latency time, 17 ms. Transfer rate is 13.3 μ s per 36-bit word. The RD10 provides high speed swapping of programs directly in and out of core memory in timesharing systems. The RD10 can also be used for user file storage. Up to 4 RD10's can be connected to one RC10 disk control unit.
		RB10A	STORAGE DISK FILE (dual positioning): stores from 20,971,520 to 104,857,600 36-bit words in multiples of 8,388,608 words. Average access time is 190 ms. Transfer rate ranges from 22.5 μ s to 72 μ s per word depending on zone being accessed. Dual head positioning arms permit overlapping of data transfer and seek operations. Basic unit includes six disks and RA10 Disk Control.
		RB10C	ADDITIONAL DISK: a maximum of 20 disks (each with a capacity of 4,194,304 words) can be added to the basic RB10. (Please specify in even multiples of two RB10C's.)
		RP10	DISK PACK CONTROL: provides control of up to eight RP02 Disk Pack Drives. Requires the DF10 data channel which provides a direct path to memory. Also requires at least one RP02.
		RP02	DISK PACK DRIVE: The RP02 provides storage for up to 5,196,800 36-bit words on interchangeable disk packs. Average access time is 62.5 ms, including 12.5 ms average rotational latency. Transfer rate is 15 μ s/word. Requires RP10 Control. Includes one RP02P pack.
		RP02P	DISK PACK: Pack for RP02 Disk Pack Drive.
Core Memory			
<i>Core memories are available in various sizes and speeds. Each memory stores 36 data bits plus a parity bit and each operates asynchronously with respect to the central processor and channel, establishing its own independent timing cycle.</i>			
MA10	CORE MEMORY: 16,384 words, 1.00 μ s cycle time. Each is supplied with one memory port with cables. Up to three MC10 Additional Memory Access Ports may be added, allowing access to a total of four processors and/or channels.		
MA10A	CORE MEMORY: 8,192 words, 1.00 μ s cycle time. Each is supplied with one memory port with cables. Up to three MC10 Additional Memory Access Ports may be added, allowing access to a total of four processors and/or channels.		
MC10	ADDITIONAL MEMORY ACCESS PORT: provides the additional cables and logic to connect an additional processor/channel to a MA10, MA10A, or MB10 memory port.		
MD10	CORE MEMORY: 32,768 words, 1.80 μ s cycle time. Supplied with four memory access ports and a memory cable set for one of these ports. Up to three additional BS10A memory cable sets are optional.		

Magnetic Tape Systems

- TD10** DECTape CONTROL: provides control for up to eight TU55 DECTape transports. Requires at least two TU55 transports. (One TD10 control is required with every PDP-10 system.)
- TU55** DECTape UNIT: reads and writes magnetic tape at a 15K characters/second rate. (Tapes are 3½ in. diameter, 260 ft. long and ¾ in. wide.) Tape units are bi-directional and redundantly recorded. Each tape has a directory, allowing random access to user files. (Two DECTape units are required per PDP-10 system.)
- TM10A** MAGNETIC TAPE CONTROL: controls up to eight tape transports. Permits reading either 7 or 9 channel (or combination of both) industry standard tape.† Requires at least one DEC magnetic tape unit of the types shown below. Magnetic tape unit types may be intermixed on a single control.
- TM10B** MAGNETIC TAPE CONTROL: same as TM10A but provides for data channel operation. Requires a DF10 data channel.
- TM10C** TM10B MODIFICATION KIT: provides necessary components for converting a TM10A Magnetic Tape Control to a TM10B.
- TU20A** MAGNETIC TAPE UNIT: reads and writes 9-channel USASI standard† magnetic tape at 45 inches/second and a density of 800 bits/inch.
- TU20B** MAGNETIC TAPE UNIT: reads and writes 7-channel industry standard tape at 45 inches/second and densities of 200, 556, and 800 bits/inch (36K characters/second).
- TU30A** MAGNETIC TAPE UNIT: reads and writes 9-channel USASI standard† magnetic tape at 75 inches/second and density of 800 bits/inch (60K characters/second).
- TU30B** MAGNETIC TAPE UNIT: reads and writes 7-channel industry standard tape at 75 inches/second, and densities of 200, 556 and 800 bits/inch (60K characters/second).

Input/Output Devices

Punched Card Equipment

- CR10A** CARD READER: reads 80-column punched cards at 1,000 cards/min (800 cards/min in systems using 50 Hz power). Card Hopper and stacker capacities are 1,000 cards.

†USASI X3.22-1968 Recorded Magnetic Tape for Information Interchange.

- CP10A** CARD PUNCH: punches cards at a rate of 200 cards/min when punching in all 80 columns. A maximum rate of 365 cards/min is possible when only the first 16 columns are punched. Card Hopper and stacker capacities are 1,000 cards.

Line Printers

		Characters	Lines/ Minute	Columns/ Line
LP10A	LINE PRINTER	64	300	132
LP10C	LINE PRINTER	64	1,000	132
LP10D	LINE PRINTER	96	600	132
LP10E	LINE PRINTER	128	500	132

Plotters

- XY10** PLOTTER CONTROL: interface for Cal-Comp 500 and 600 series digital incremental plotters.

XY10A PLOTTER AND CONTROL

Cal Comp Plotter Model	Step Size	Speed (Steps/ Minute)	Width (Inches) Paper
XY10(565)	0.01 inches	18,000	12
	0.005 inches	18,000	
	0.1 mm.	18,000	

XY10B PLOTTER AND CONTROL

XY10(563)	0.01 inches	12,000	31
	0.005 inches	18,000	
	0.1 mm.	18,000	

Data Communication Equipment

Data Line Scanner

Data Line Scanner provides on-line servicing of up to 64 communication lines. Accommodates any device which uses eight level serial teletype code at speeds up to 100 kilobaud. Full duplex with local copy, and half duplex data modes are available on each line serviced.

- DC10A** CONTROL UNIT: the scanner and control unit for the DC10 communication controller provides 4 units of cabinet space and power supplies for various combinations of line equipment.
- DC10B** 8-LINE GROUP UNIT: provides teletype interface for up to 8 local lines, full duplex. May be used with duplex or full duplex with local copy data sets. When used with data sets, communications must be established, maintained, and terminated manually, unless DC10E Expanded Data Set Control Units are provided. Requires one unit of cabinet space in a DC10A or DC10F.

- DC10C** 8-LINE TELEGRAPH RELAY ASSEMBLY: provides conversion from local to long lines using full or half-duplex facilities. Requires two units of cabinet space in a DC10A or DC10F.
- DC10D** TELEGRAPH POWER SUPPLY: the standard line voltage supply used with DC10C (120V dc at 2 amperes). No additional cabinet space required.
- DC10E** EXPANDED DATA SET CONTROL: provides expanded control of eight data sets in the DC10 system. Requires two units of cabinet space in a DC10A or DC10F.
- DC10F** EXPANDER CABINET: provides eight units of cabinet space and power supplies for expansion beyond capacity of DC10A.

680/I Data Communication System

680/I Data Communication System provides on-line servicing of up to 63 communication lines. System handles 8 level serial teletype code at speeds of 110, 150, or 300 baud. Terminals may be local or remote via modems (data sets). To configure a 680/I system, determine the number of lines, both local and data set. Add to the basic communication system enough M750 dual serial line adapters for the total line capacity. (The maximum number of lines is 63.) A 680/I system must include one DC68A. If there are any local teletypes, a DC08B is required. If there are more than 48 local teletypes, a second DC08B is required. Each data set line requires one 689LM. If there are 1 to 32 data set lines, one 689AG is required. If there are more than 32 data set lines, a second 689AG is required.

- DC68A** BASIC COMMUNICATION SYSTEM: includes hardware common to any 680/I system for PDP-10 use. Additional options listed below are required to implement a specific number of local or data set lines. The DC68A basic system includes one DA10 PDP-8/PDP-10 interface, one PDP-8/I-D computer (rack mounted with 4K of memory with MP8/I parity option, and an ASR33 teleprinter), one DW08A negative bus adapter, one DL8/I serial line adapter, one DC08A serial line multiplexor, and DC08Y clocks for 110, 150, and 300 baud.
- M750** DUAL SERIAL LINE ADAPTER: implements two full duplex channels in the basic communication system. One unit is required for every two local or data set lines.
- DC08B** LOCAL LINE PANEL: accommodates up to 48 local terminals suitable for direct 680/I connection.

- 689AG** MODEM INTERFACE: provides control interface and mounting space for up to 32 689LM's.
- 689LM** MODEM INTERFACE AND CONTROL: provides complete interfacing to and control of one BELL 100 series modem (data set) or equivalent.

Teletypes and Terminals

For Local DC10 Use

- LT33A** TELEPRINTER: 33TS machine (KSR33, friction feed).
- LT33B** TELEPRINTER: 33TY machine (ASR33, sprocket feed, automatic reader control XON/XOFF feature).
- LT35A** TELEPRINTER: VSL312HF machine (KSR35, sprocket feed).
- LT37AC** TELEPRINTER: KSR37, sprocket feed, 60 Hz Operation only. Also suitable for use with Bell System 103-type data set or equivalent.

For Local 680/I Use

- LT33C** TELEPRINTER: 33TS machine (KSR33, friction feed).
- LT33H** TELEPRINTER: 33TY machine (ASR33, sprocket feed, automatic reader control XON/XOFF feature).
- LT35C** TELEPRINTER: VSL312HF machine (KSR35, sprocket feed).

Display Systems

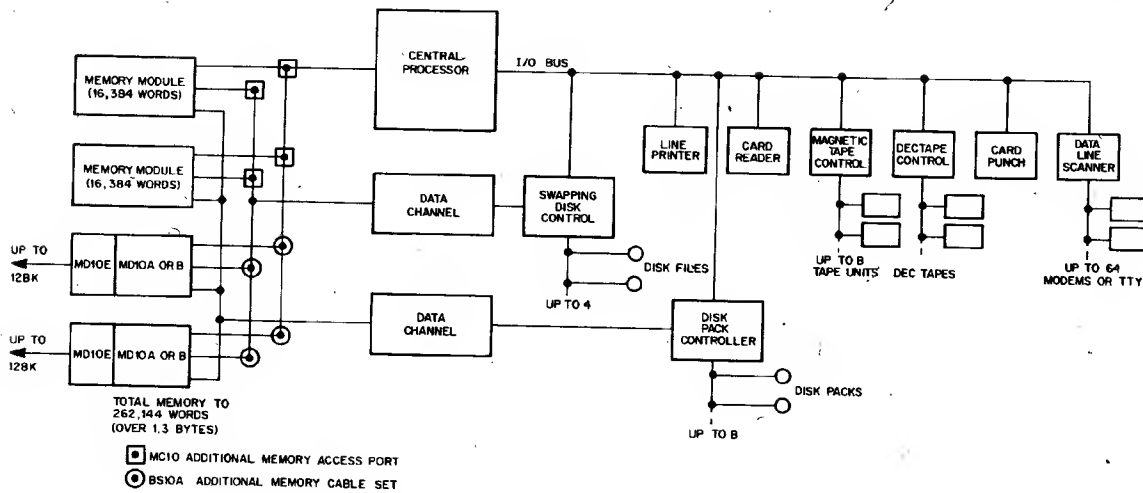
- 346/340B** PRECISION INCREMENTAL CRT DISPLAY: plots points, lines, vectors, and characters on a 9 $\frac{3}{8}$ in. square raster of 1,024 points along each axis. 1 $\frac{1}{2}$ μ s is required per point in vector, increment, and character modes. Random point plotting rate of 35 μ s. A 370 high-speed Light Pen is included.
- 342B** CHARACTER GENERATOR for 346/340B
- 348/VR30** PRECISION POINT PLOTTING DISPLAY: operates at a maximum plotting rate of 20 KC or one point every 50 μ s on a 9 $\frac{3}{8}$ in. x 9 $\frac{3}{8}$ in. display area. Number of addressable points along each axis is 1024. A 370 high-speed Light Pen is included.
- VP10** POINT PLOTTING DISPLAY CONTROL: operates at either of two maximum plotting rates. Low rate is 10 KC (one point every 100 μ s). High rate is 50 KC (one point every 20 μ s). Number of addressable points along each axis is 1024. Control interfaces to a customer supplied oscilloscope (Tektronix Type RM503 or equivalent) or to a CRT display.
- 370** HIGH SPEED LIGHT PEN: for use with VP10.

Miscellaneous

DA10 PDP-8 or PDP-9 to PDP-10 INTERFACE GP10

DK10 PROGRAMMABLE REAL TIME CLOCK:
unit is supplied with a crystal oscillator which
provides a resolution of 10 μ s.

GENERAL PURPOSE INTERFACE TO
PDP-10 I/O BUS: includes cabinet, two 728
power supplies, one 844 power control, indi-
cators, end panels, fan, convenience outlet
with fans, and BS10A/15 ft. cable set. Logic
provides a status register, device decoding,
read-in gating and line buffering.



TYPICAL PDP-10 SYSTEM CONFIGURATION

Appendix B
PDP-10 Software

Table B-1 shows the DEC-supplied system software (CUSPs) currently available to PDP-10 users.

Table B-1
PDP-10 Software

Name of CUSP	Comment
AID	See description in PDP-10 User's Bookshelf in Appendix C.
BASIC	See PDP-10 User's Bookshelf in Appendix C.
BATCH	See PDP-10 User's Bookshelf in Appendix C.
BINCOM	Documented in this handbook.
*CHKPNT	Saves current charge file and initiates a new one.
CODE	See PDP-10 User's Bookshelf (supplementary documents) in Appendix C.
*COMPIL	Documented in this handbook.
COPY	See PDP-10 User's Bookshelf (supplementary documents) in Appendix C.
CREF	Documented in this handbook.
*DD10	Loads system to disk from DEctape.
DDT	Documented in this handbook.
*DSKLST	Snapshot of disk.
EDITOR	Documented in this handbook.
*FAILSAFE	Saves the contents of disk on magtape and later restores these contents back onto the disk.

Table B-1. (cont)
PDP-10 Software

Name of CUSP	Comment
*FILDDT	Debugging aid for the Monitor.
FORTTRAN IV (F40)	See PDP-10 User's Bookshelf in Appendix C.
FUDGE2	Documented in this handbook.
GLOB	Documented in this handbook.
*LINED	Documented in this handbook.
LOADER	Documented in this handbook.
*LOGIN	Documented in this handbook.
*LOGOUT	Documented in this handbook.
MACRO	Documented in this handbook.
*MONEY	Lists charges of computer users.
PIP	Documented in this handbook.
PIPl	Documented in this handbook.
*PRINT	Queues files for LPT.
*PRINTR	Prints selected system files.
*REACT	Alters system accounting file (login numbers and codes).
SRCCOM	Documented in this handbook.
*STACK	See PDP-10 User's Bookshelf in Appendix C.
*SYSTAT	Snapshot of time-sharing system.
TECO	Documented in this handbook.
TENDMP	Documented in this handbook.
*Currently available in disk systems only	

pdp10 user's bookshelf

A Bibliography of PDP-10 Programming Documents

OCTOBER, 1969

Software documents in this bibliography can be obtained from Digital Sales Offices or by sending a written request (with check or money order) to *Program Library, Digital Equipment Corporation, Maynard, Massachusetts 01754*. The following key, which indicates the current status of software manuals and their relationship to preceding editions, is designed to help the reader determine whether the present content of a given manual meets his needs.

- (1) *New* signifies that the manual is being published for the first time (designated by a box).
- (2) *Major Revision* signifies that new capabilities and/or changed procedures have been incorporated in the manual (designated by an asterisk).
- (3) *Minor Revision* signifies that the manual remains essentially the same as its predecessor.
- (4) Manuals that are unchanged since the last bibliography are shown with only the date of publication after the title.

PDP-10 System Reference Manual

Minor Revision
August, 1969

An indexed programmer's handbook that describes the PDP-10 processor and the basic instruction repertoire. Following an introduction to the PDP-10's central processor structure, general word format, memory characteristics, and assembler source-programming conventions, this manual presents the specific instruction format, mnemonic and octal op codes, functions, timing formulas, and examples of each of the basic instructions. Several helpful appendices, including mnemonic op code tables, algorithms and timing charts, complete the manual.

Order No. DEC-10-HGAC-D \$5.00

*Time-Sharing Monitors:

Multiprogramming Monitor (10/40) Major Revision
Swapping Monitor (10/50) August, 1969

A complete guide to the use of the PDP-10's two powerful, real-time, multiprogramming, time-sharing Monitors. Both Monitors schedule multiple-user time sharing of the system, allocate facilities to programs, accept input from and direct output to all system I/O devices, and relocate and protect user programs in storage. This manual details user interaction with the Monitors, from both a programming and operating viewpoint, and contains several quick-reference tables of commonly used Monitor commands and parameters, as well as examples of user coding.

Order No. DEC-T9-MTZA-D \$3.00

AID (Algebraic Interpretive Dialogue)

October, 1968

A 'hands-on' guide to the use of AID at the Teletype console. AID, a PDP-10 version of JOSS¹, is an on-line system which provides each user with a personal computing service utilizing a conversational algebraic language. This manual describes the use of the Teletype, the syntax and general rules governing the AID language, and each of the AID commands, with appropriate examples.

Order No. DEC-10-AIBO-D \$3.00

¹JOSS is a trademark and service mark of the RAND Corporation for its computer program and services using that program.

Single-User Monitor Systems

November, 1968

A complete guide to the use of the Single-User Monitor, which performs fast job-to-job sequencing, provides I/O service for all standard devices, and is upward compatible with the Time-Sharing systems. This manual contains the same type of helpful information as the Time-Sharing manual described above.

Order No. DEC-10-MKDO-D \$2.00

Batch Processor (Batch) and Job Stacker (Stack)

May, 1969

An indexed manual containing all information required to prepare and run user jobs under control of the Batch Processor in either a single-user or time-sharing environment. Batch supervises the sequential execution of a series of jobs with a minimum of operator attention, yet allows the operator to interrupt, skip, repeat, or prematurely terminate one or more of the jobs in the series at any time. Job Stacker is used in conjunction with Batch to (1) transfer job files to the Batch input device and stack them there for subsequent input to Batch, (2) transfer Batch output job files from the Batch output device to some other device, (3) list job file directories, (4) delete job files, and (5) list directories with selective file deletion or transfer.

Order No. DEC-10-MBAC-D \$1.00

*System User's Guide

Major Revision, Available
August, 1969

A fact-filled operations guide designed for handy reference at the user's Teletype console. Contains the basics of Teletype usage and complete operating procedures for all Commonly Used Service Programs (CUSP'S). Includes complete write-ups on DECTape Editor, Advanced BASIC, LINED, CCL (Concise Command Language), and Linking Loader. A typical chapter includes a brief description of the program, its operating environment, initialization procedures, command string formats, special switches, diagnostic messages, and in-depth examples. The manual is tab-indexed for the user's convenience.

Order No. DEC-10-NGCC-D \$10.00

COBOL LANGUAGE

August, 1969

A reference manual designed to aid the user in writing COBOL programs for the PDP-10. Each COBOL language element is accorded a detailed treatment that explains and demonstrates its use in a variety of programming contexts. The four major divisions of a COBOL program and their conventional formats are clearly described and effectively illustrated. Other subjects given extended coverage in this manual are the COBOL library, COBOL reserved words, and the CALL procedure. Each chapter contains numerous examples of the efficient use of the components of a COBOL program. Indexed.

Order No. DEC-10-KC1A-D \$6.00

TECO (Text Editor and Corrector)**Minor Revision,
August, 1969**

This programmer's reference manual describes the powerful context editor for the PDP-10. Editing is done on a character, line or variable character string basis. Describes more than 30 commands for inserting, deleting, appending, searching for, and displaying text.

Order No. DEC-10-ETEC-D

\$1.50

FORTRAN IV**September, 1968**

This manual describes statements and features of FORTRAN IV on the PDP-10. Includes descriptions of library functions, calling library subroutines from the Science Library, and the FORTRAN IV operating System. An appendix contains language differences for those using the small (5.5K) PDP-10 FORTRAN Compiler.

Order No. DEC-10-AFCO-D

\$2.00

ADVANCED BASIC**Minor Revision, August, 1969**

A valuable guide to the BASIC® commands needed for a more efficient expression of scientific, business, and educational problems. The manual contains complete tutorial explanations of these additional features: (1) matrix computations; (2) alphanumeric information handling; (3) program control and storage facilities; (4) program editing capabilities; (5) formatting of Teletype output; and (6) documentation and debugging aids.

Order No. DEC-10-KJZB-D

\$3.50

PIP (Peripheral Interchange Program)**November, 1968**

Explains how PIP is used to transfer data files between standard peripheral devices. Shows how command strings are written, describes switches available for optional functions, techniques for handling file directories, error messages and other features.

Order No. DEC-10-PPCO-D

\$1.00

Science Library and Fortran Utility Subprograms**October, 1968**

A general reference manual covering Science Library arithmetic function and utility subprograms and FORTRAN IV nonmathematical utility subprograms (e.g., CHAIN, PDUMP, DATE, TIME). A functional description followed by the calling sequence, list of external subprograms called, entry points, and subprogram length, is given for each subprogram. In addition, the type of argument(s) and result, a description of the algorithm used, and a discussion of the accuracy of the algorithm are given for each function. Appendices contain information on error analyses, double-precision format and input conversion, a bibliography, and average run times.

Order No. DEC-10-SFLC-D

\$4.00

MACRO-10 Assembler**Minor Revision, October, 1969**

The programmer's reference manual for the PDP-10 assembly system. Explains format of statements, use of pseudo-operations, and coding of macro instructions which make MACRO-10 one of the most powerful assemblers available.

Order No. DEC-10-AMZA-D

\$3.00

PDP-10 Reference Card**May, 1968**

A handy pocket-sized guide to instruction mnemonics, hard-

ware and software (Monitor system) word formats, and instruction codes.

Order No. DEC-10-J00 A-D

\$0.25

PDP-10 Interface Manual**May, 1968**

A complete guide to the process of interfacing any type of experimental apparatus, special purpose I/O devices, or other user-constructed items to the PDP-10 system. This manual details user time-sharing, I/O bus, console, memory bus, and channel bus requirements and provides other information useful to both the novice experimenter and the advanced logic designer.

Order No. DEC-10-HIFB-D

\$10.00

**DDT-10 (Dynamic Debugging Technique) Minor Revision,
April 1969**

This reference manual describes the dynamic debugging program used for on-line checkout and testing of MACRO-10 and FORTRAN programs. The commands of DDT are grouped so that they can be used easily and effectively by both the uninitiated user and the experienced programmer. Included in the appendices is an informative summary of all DDT functions.

Order No. DEC-10-CDDC-D

\$1.00

The following supplementary documents are also available from the Program Library.

Concise Command Language (CCL) for the PDP-10		
Time-Sharing Monitors	DEC-10-RWDA-D	\$1.00
CHAIN (Reads CHAIN Files into Core and Links Them to Resident Programs)	DEC-10-LOVB-D	1.00
PDP-10 ASCII/BCD Code Conversion Program (CODE)	DEC-10-YNZA-D	1.00
PDP-10 DECTape Copy Program (COPY)	DEC-10-RPTA-D	1.00
FAILSAFE—Disk Save and Restore Program	DEC-10-YPDA-D	1.00
FORTRAN IV Software Maintenance Memos	DEC-10-KF1A-D	1.00
GLOB (Global Symbol Cross-Reference List)	DEC-10-YRZA-D	1.00
LINED—A Line Editor for PDP-10 Disk Files	DEC-10-EZDA-D	1.00
Linking Loader V.27	DEC-10-LLZA-D	1.00
MACRO V.24 Addendum (Supplements MACRO-10 Assembler Manual)	DEC-10-AMBO-DN	No Charge
FORTRAN IV Utility Subprograms (RELEASE, MAGDEN, BUFFER, IFILE, and OFILE)	DEC-10-FIYB-D	1.00
TENDUMP—DECTape Utility Program	DEC-10-LZYC-D	1.00
PDP-8 Scan 680 for PDP-10	DEC-10-RSCB-D	1.00
DCO8A/689AG Data Line Scanner for PDP-10	DEC-10-RWVA-D	1.00
Software Manual Update, August 1969 (Insert Pages for Updating PDP-10 Software Documents)	(No Order No.)	1.00

MASTER INDEX/GLOSSARY

Page numbers are those which appear in boldface at the top center of each page.

Absolute address:

An address that is permanently assigned by the machine designer to a storage location. See Monitor 354.

Absolute binary programs, 250

Absolute coding:

Coding that uses machine instructions with absolute addresses.

AC, 20

Access:

See random access, remote access, serial access.

Access time:

(1) The time interval between the instant at which data are called for from a storage device and the instant delivery is started.

(2) The time interval between the instant at which data are requested to be stored and the instant at which storage is started.

(3) See page 15

Accumulator, 9, 15, 354

ADD, 17, 45

Address:

(1) An identification, as represented by a name, label, or number, for a register, location in storage, or any other data source or destination such as the location of a station in a communication network.

(2) Loosely, any part of an instruction that specifies the location of an operand for the instruction.

Address assignments, 205-207

indexing, 206

indirect, 206

literals, 206

location counter, 205, 361

Address break, 98, 106, 107

Address format:

The arrangement of the address parts of an instruction.

Address mode,

absolute, 211

relocatable, 211

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Algorithm:

A prescribed set of well-defined rules or processes for the solution of a problem in a finite number of steps, e.g., a full state-

ment of an arithmetic procedure for evaluating SINX to a stated precision. Contrast with heuristic.

(1) fixed point, 176-181

(2) floating point, 181-186

Allocation:

See storage allocation.

Allocation of devices, 315

Alphabet:

(1) An ordered set of all the letters and associated marks used in a language.

(2) An ordered set of letters used in a language, e.g., the 128 characters of the USASCII alphabet.

Alphanumeric:

Pertaining to a character set that contains both letters and digits and usually other characters such as punctuation marks. Synonymous with alphameric.

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ANDCA, 38

ANDCB, 39

ANDCM, 38

AOBJN, 59

AOBJP, 59

AOJ, 62

AOS, 63

APR, 91, 97, 101

AR (address register), 8

Argument:

An independent variable, e.g., in looking up a quantity in a table, the number, or any of the numbers that identifies the location of the desired value.

Arithmetic and logical operations, 203

shift, 44, 49

testing, 59-64

Arithmetic testing, 59-64

Array:

An arrangement of elements in one or more dimensions.

AS (address switch register), 7, 8

ASCII:

Same as USASCII.

Standard, 220, 240

ASCIZ, 220

ASH, 42, 59

ASHC, 42, 50

Assemble:

To prepare a machine language program from a symbolic language program by substituting absolute operation codes for symbolic operation codes and absolute or relocatable addresses for symbolic addresses. See MACRO-10.

Assembler:

- (1) A computer program which accepts symbolic code and translates it into machine instructions, item for item. See MACRO-10.
- (2) evaluation of statements and expressions, 267
- (3) interpretation of macros, 271

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- processing, 223

Assembling TENDMP, 625

Assembly

- listing, 247
- output, 247

ASSIGN command, 316, 348

ASSIGN SYS command, 348, 425

Asynchronous:

The PDP-10 hardware does not rely on an internal clock to indicate by signal that one operation has been executed before beginning a second operation.

ATTACH command, 345, 348

B operator (binary shift), 202

Background Job Control Commands

- ATTACH job, 345
- CCONT, 344
- CSTART, 344
- DETACH, 344
- PJOB, 344

Background processing:

The automatic execution of lower priority computer programs when higher priority programs are not using the system resources.

Base:

- (1) A reference value.
- (2) A number that is multiplied by itself as many times as indicated by an exponent.
- (3) Same as radix.

Base address:

A given address from which an absolute address is derived by combination with a relative address. See memory protect, virtual memory.

BASIC (Advanced), 636

Batch, 635

Batch processing:

Pertaining to the technique of executing a set of computer programs such that each is completed before the next program of the set

is started.

Loosely, the execution of computer programs serially.

Bell character:

A communication control character intended for use when there is a need to call for human attention. It may activate alarm or other attention devices. Abbreviated BELL.

Benchmark problem:

A problem used to evaluate the performance of computers relative to each other.

Binary:

- (1) Pertaining to a characteristic or property involving a selection, choice, or condition in which there are two possibilities.
- (2) Pertaining to the numeration system with a radix of two.
- (3) See 89, 111, 112, 116
- (4) arithmetic, see 10.

Binary code:

A code that makes use of exactly two distinct characters, usually 0 and 1.

Binary-coded decimal notation:

Positional notation in which the individual decimal digits expressing a number in decimal notation are each represented by a binary numeral, e.g., the number twenty-three is represented by 0010 0011 in the 8-4-2-1 type of binary-coded decimal notation and by 10111 in binary notation. Synonymous with BCD.

Binary Compare, 618-620

- commands, 618-619
- diagnostic messages, 619-620
- initialization, 618
- on CUSP, 634
- requirements, 618

Binary digit:

In binary notation, either of the characters, 0 or 1. Abbreviated bit.

Binary program output

- absolute, 247, 250
- relocatable, 248

Binary shifting, 201

BINCOM, see binary compare

Bit:

- (1) A binary digit.
- (2) See parity bit.
- (3) Position determination, see 200.

Bits, file status, 398

BLK1, 88, 190, 193

BLK0, 88, 193

BLOCK, 221

Block:

- (1) A set of things, such as words, characters, or digits

- handled as a unit.
- (2) A collection of contiguous records recorded as a unit. Blocks are separated by interblock gaps and each block may contain one or more records.
- (3) A group of bits, or binary digits, transmitted as a unit over which an encoding procedure is generally applied for error-control purposes.
- Block gap:**
An area on a data medium used to indicate the end of a block or record. Synonymous with interblock gap.
- Block I/O,** 88
- Block length:**
A measure of the size of a block, usually specified in units such as records, words, computer words, or characters.
- Block transfer:**
The process of transmitting one or more blocks of data where the data are organized in such blocks. See 28.
- Block types,** 249-251
- BLT,** 28
- Boolean,** 35
- Bootstrap:**
A technique or device designed to bring itself into a desired state by means of its own action, e.g., a machine routine whose first instructions are sufficient to bring the rest of itself into the computer from an input device. See 15.
- BR (buffer register),** 9
- Branch:**
- (1) A set of instructions that are executed between two successive decision instructions.
 - (2) To select a branch as in (1).
 - (3) A direct path joining two nodes of a network or graph.
 - (4) Loosely, a conditional jump.
- Branchpoint:**
A place in a routine where a branch is selected.
- Breakpoint:**
A place in a routine specified by an instruction, instruction digit, or other condition, where the routine may be interrupted by external intervention or by a monitor routine. See DDT-10 for use of breakpoints in debugging.
- Buffer:**
A routine or storage device used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transmitting data from one device to another. See 127, 128.
- Buffer header,** 401
- Buffer structure,** 396
- Buffers**
- Monitor generated, 402
 - user generated, 403
- Bug:**
A mistake or malfunction.
- Busy (I/O),** 89, 112, 116, 117, 119, 128, 134, 140, 142
- BYTE,** 217
- Byte:**
- (1) An aggregate of bits whose size lies between that of a word and that of a single bit. On the PDP-10 the byte size is controlled by the programmer.
 - (2) manipulation, 33-35
 - (3) size, altering, 217
size manipulation, 218
 - (4) pointer, 33
 - (5) unpacking subroutine, 257
- Byte interrupt,** 73, 75, 104
- CAI,** 60
- CAL,** 229
- Calculating the logarithm of a complex argument,** 256
- Call:**
- (1) To transfer control to a specified closed subroutine.
 - (2) In communications, the action performed by the calling party, or the operations necessary in making a call, or the effective use made of a connection between two stations.
 - (3) Synonymous with cue.
- CALL and CALLI Monitor operations,** 372
- Calling sequence:**
A specified arrangement of instructions and data necessary to set up and call a given subroutine.
- Calls, macro (see macro calls)**
- CAM,** 61
- Card codes,** 162
- Card in punch,** 141
- Card punch,** 140-144, 442
- codes, 162-164
 - data modes, 442
 - interrupts, 141, 142
 - operation, 144
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- Card reader,** 136-140, 441
- card codes, 443
 - codes, 162-164
 - data modes, 441
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- Carries,** 44
- Carry 0,** 44, 63, 64, 73
- Carry 1** 44, 63, 64, 73
- CCONT command,** 344, 375, 376
- CDP (card punch),** 140-142

Central processing unit:

A unit of a computer that includes the circuits controlling the interpretation and execution of instructions. Synonymous with main frame.

Central processor, 102-109

indicators, 102
operating keys, 105
operating switches, 107

CHAIN, 636**Chained list:**

A list in which the items may be dispersed but in which each item contains an identifier for locating the next item to be considered.

Chaining search:

A search technique in which each item contains an identifier for locating the next item to be considered.

Changing the local radix, 215**Channel:**

- (1) A path along which signals can be sent, e.g., data channel, output channel.
- (2) A partially autonomous portion of the PDP-10 which can overlap I/O transmission while computations proceed simultaneously.

Character:

A letter, digit, or other symbol that is used as part of the organization, control or representation of data. A character is often in the form of a spatial arrangement or adjacent or connected strokes.

Character(s) (MACRO-10)

interpretations, 265
strings, 198

Character codes, 48**Character handling in macros, 271****Character string:**

A string consisting solely of characters.

Check bit:

A binary check digit, e.g., a parity bit.

Check character:

A character used for the purpose of performing a check.

Check sum, 114, 115**CHKPNT, 634****CLEAR (see SETZ), 36****Clear:**

To place one or more storage locations into a prescribed state, usually zero or the space character. Contrast with set.

Clock:

- (1) A device that generates periodic signals used for synchronization.
- (2) A device that measures and indicates time.

- (3) A register whose content changes at regular intervals in such a way as to measure time.
- (4) See 98, 107 (interrupt)

Clock - hardware option programmable, 632**CLOG (sample MACRO program), 256****CLOSE programmed operator, 418****Closed subroutine:**

A subroutine that can be stored at one place and can be connected to a routine by linkages at one or more locations. Contrast with open subroutine.

COBOL (COMMON Business Oriented Language):

A business data processing language.

COBOL language manual, 635**CODE, ASCII-BCD conversion program, 636****Code:**

- (1) A set of unambiguous rules specifying the way in which data may be represented, e.g., the set of correspondences in the standard code for information interchange.
- (2) To represent data or a computer program in a symbolic form that can be accepted by a data processor.

Code set:

A finite and complete set of representations defined by a code.

Codes

error, 241
text, 269

Collating sequence:

An ordering assigned to a set of items, such that any two sets in that assigned order can be collated.

Command execution, 313**Command format**

command arguments, 311
command names, 311

Command language:

A source language consisting primarily of procedural operators, each capable of involving a function to be executed.

Commands, DDT

breakpoints, 544-545, 559-563
changing output radix, 557
defining symbols, 566
deleting symbols, 567
miscellaneous, 564-565
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Commands, TECO

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- insert text, 510
- I/O; 506
- iteration, 514, 517
- macro, 514, 517
- magnetic tape positioning, 505
- numeric values and arguments, 515
- opening an I/O file, 509
- output data, 510
- pointer positioning, 510
- Q-Register, 513, 517, 518
- read a page, 509
- search, 512, 513, 517
- select I/O device, 503- 04
- termination, 517
- typing text, 511
- Commands, TENDMP, 626
- Comments field, 17, 197
- COMMON (Subroutine), 380
- Communication hardware options
 - control unit, 630
 - data line scanner, 630
 - expanded cabinet, 631
 - expanded data set control, 631
 - telegraph power supply, 631
 - telegraph relay, 631
- Communications system model 680/I
 - basic system, 631
 - dual serial line adapter, 631
 - local line panel, 631
 - modem interface, 631
- Communication with Monitors, 210
- COMPIL, 335, 634
- Compile:
 - To prepare a machine language program from a computer program written in another programming language by making use of the overall logic structure of the program, or generating more than one machine instruction for each symbolic statement, or both, as well as performing the function of an assembler.
- Compiler:
 - A computer program more powerful than an assembler. A compiler accepts symbolic code which it then translates and expands.
 - Examples in PDP-10 systems: FORTRAN and COBOL.
- COMPILE command, 324
- Compile switches, 329
- Complement, 10, 37, 38, 39, 40
- Concatenation:
 - (1) The joining of two strings of characters to produce a longer string often used to create symbols in macro defining. See 237
 - (2) of macros, 272
- Conditional assembly, 222
- Conditional jump:
 - A jump that occurs if specified criteria are met.
- Configuration Table entries, 381
- Configuration for PDP-10, 632
- CONI, 87, 88, 89, 376
- CONO, 86, 89, 90, 92
- Conservation
 - memory, 217
 - storage, 220
- CONSO, 88
- Console,
 - data transfers, 91
 - user's, 309
- CONSZ, 87, 88
- CONT
 - command, 339, 375, 376
 - instruction, 105
- Context switching:
 - The saving of key registers prior to switching between jobs, as in in time sharing.
- Control characters, 430
- Control count, 27, 31
- COPY, 636
- CORE command, 317
- Core control, 420
- Core memory hardware options
 - additional access port, 629
 - cable sets, 629
 - data channel, 629
 - expansion module, 629
- Core storage check, 312
- Counter:
 - A device such as a register or storage location used to represent the number of occurrences of an event.
- CPA (see APR), 97
- CPU:
 - Central Processing Unit
- CR (card reader), 136-138
- Create:
 - A file is created when it has been opened for writing, written upon, and closed for the first time.
 - Only one user may be creating the file at a time. A segment is created by the CORE or REMAP UWO.
 - Logically, GET, R, and RUN commands also do core UWO's.
- CREATE command, 321
- Created symbols, 235
- CREF command, 324
- CREF, see cross reference listing
- CRE.TMP, 336
- Cross reference listing, 604-608
 - commands, 605-606
 - diagnostic messages, 607
 - initialization, 605
 - monitor commands, 608
 - requirements, 605
 - switches, 606-607
- CRT display:
 - Cathode ray tube display.
- CSTART command, 344
- CTEST command, 348
- Current address, 17
- CUSP (Commonly Used Systems Programs, e.g., FORTRAN, PIP, etc.)
- CUSP command level, 303, 304

- CUSP I/O level, 303, 304
- Cylinder:
A disk can be considered to be a set of cylinders with one cylinder corresponding to each position of the disk arms.
-
- D command, 340
- D switch, 364
- Data bank:
A comprehensive collection of libraries of data. For example, one line of an invoice may form an item, a complete invoice may form a record, a complete set of such records may form a file, the collection of inventory control files may form a library, and the libraries used by an organization are known as its data bank.
Synonymous with data base.
- Data blocks, 252
- Data channel, 400
- DATAI, 87, 88, 90
- Data missed, 136, 137, 138
- Data modes
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unbuffered, 394, 413
- DATAO, 87-90
- Data ready, 136-138
- Data request, 140-143
- Data transmission, 412
- DAYTIME command, 346
- DDT (Dynamic Debugging Technique):
A program used for on-line testing and debugging of object programs, 304
command, 339
submode, 432
- DDT-10, 537-582
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symbols, 543, 552, 566-569
type in modes, 543, 553
type out modes, 541, 552
upper and lower case, 551
- DD10, 633
- DEASSIGN command, 316
- Debug:
To detect, locate, and remove mistakes from a routine or malfunctions from a computer. Synonymous with troubleshoot. See 224
- DEBUG, Monitor command, 325
- Debugging CUSPs, 342
- DEC, Macro-10 pseudo-op, 215
- Decimal print routine, 83
- Decision table:
A table of all contingencies that are to be considered in the description of a problem, together with the actions to be taken. Decision tables are sometimes used in place of flowcharts for problem description and documentation.
- Decode:
To apply a set of unambiguous rules specifying the way in which data may be restored to a previous representation, i.e., to reverse some previous encoding.
- DECTape:
A DEC development of convenient, pocket-sized reels of random access magnetic tape.
block format, 446
compatibility between DEC computers, 481
data modes, 445
directory format, 446
file format, 448
programmed operators, 449
- DECTape control, 630
- DECTape Editor, 493-497
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- DECTape unit, 630
- DEFINE, 233
- Defined symbol, 197
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- Defining and calling macros, 271
- DELETE command, 324
- Deleted symbols, 199
- Deleting file from tape, 624
- DEPHASE, 213
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- DEPOSIT NEXT, 106
- DETACH command, 344
- DETACH dev command, 344, 348
- Device code, 17
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- Device summary, 427
- Devices

directory, 393
 non-directory, 393
 Devices, allocation of, 315
 DFN, 55
 Direct addressing, 13, 16
 Direct assignment statements, 199
 DIRECT command, 323
 Directory device:
 A storage retrieval device such as disk or DECTape which contains a file describing the layout of stored data (programs and other files).
 Directory name:
 (1) "Project-programmer number" pair which uniquely identifies a directory.
 (2) The device name in the case of DECTape or magtape.
 Directory, zeroing a, 623
 Disk, 461
 data modes, 461
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 swapping control, 629
 swapping file, 629
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 precision incremental CRT, 631
 precision point plotting, 631
 DIV, 47
 Done (I/O), 89, 112, 116, 119, 121, 128, 134
 Dormant segment:
 Description of a sharable high segment kept on swapping space and possibly core which is in no user's addressing space.
 Double equal sign, 199
 Double length numbers, 11
 Double precision:
 (1) Pertaining to the use of two computer words to represent a number.
 (2) floating point, 85
 DPB, 34, 218
 DS (register), 7
 DSKLST, 634
 Dump:
 A listing of all variables and their values or a listing of the values of all locations in core.
 Dumping program onto tape, 623

 E, effective address, 13, 19
 Monitor command, 339
 EDDT, see Dynamic Debugging Technique
 EDIT command, 321
 EDITOR, see DECTape Editor

EDS.TMP, 336
 EDT.TMP, 337
 Effective address:
 (1) The actual address used, that is the specified address as modified by any indexing or indirect addressing rules.
 (2) see 13, 43, 49, 51, 72, 79, 86, 96
 (3) MACRO-10, 206
 END, 223, 252
 End block, 250
 End of card, 136-143
 End of file, 137
 End of transmission block character (ETB)
 A communication control character used to indicate the end of a block of data where data are divided into blocks for transmission purposes.
 Entering data, 214
 changing local radix, 215
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 under prevailing radix, 214
 ENTER programmed operator, 403
 ENTER (UUO), 318
 ENTRY, 231
 Entry block, 249
 EOT:
 The end of transmission character.
 EQV, 41
 Error codes (MACRO-10), 241
 A, D, E, L, 241
 M, N, O, P, 242
 Q, R, S, U, V, 243
 Error detection, 241
 Error message:
 An indication that an error has been detected. See 127, 129
 ETX:
 The end of text character.
 EXAMINE NEXT, 105
 EXAMINE THIS, 106
 Excess 128 code, 11
 EXCH, 27
 EXECUTE command, 325
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 REASSIGN, 316

- RESOURCES, 318
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FAD, 56
FADR, 53
FAILSAFE, 634, 636
Fast memory, 9
FDV, 58
FDVR, 54
Field:
In a record, a specified area used for a particular category of data, e.g., a group of card columns used to represent a wage rate or a set of bit locations in a computer word used to express the address of the operand.
FILDDT, 634
File:
A collection of related records treated as a unit. In the PDP-10, a named or unnamed collection of 36 bit words (instructions and/or data). Length is not restricted by size of core. One of the uses of files is to initialize segments when they are created with instructions and/or data. See 392
owner, 408
protection, 408
protection key, 409
selection, 403
status bits, 398
File extension:
1 to 3 alphanumeric characters usually chosen by the program to describe the class of information in file.
extensions, 319
list of, 320
File manipulation Monitor commands
COMPILE, 324
CREF, 324
DEBUG, 325
DELETE, 324
DIRECT, 323
EXECUTE, 325
LIST, 323
LOAD, 325
RENAME, 324
TYPE, 323
File, Monitor handling of
comparison with segments, 307
created, 306
names, 306
superseded, 307
updated, 307
Filename:
1 to 6 alphanumeric characters chosen by the user to identify the file. See 319
File structured device:
A device on which data is given names and arranged into files; the device also contains directories of these names.
File update generator, 597, 603
commands, 598-599
diagnostic messages, 602-603
initialization, 597
requirements, 597
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FOR.TMP, 336
MAC.TMP, 336
PIP.TMP, 336
SVC.TMP, 335
FINISH command, 317
Fixed point, 10
arithmetic, 44-50, 64
decimal numbers, 202
double length, 44
Flag:
(1) Any of various types of indicators used for identification.
(2) A character that signals the occurrence of some condition, such as the end of a word.
(3) restoration, 77
Flags, 71, 75, 77, 95, 97, 104, 105, 115
address break, 98, 106, 107
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trap offset, 98
trouble, 136, 137, 140, 141

user, 73, 101
 user in-out, 74, 86, 96, 98, 104
 Floating overflow, c.51-58, 73, 98
 Floating point representation,
 (1) A numeration system in which
 each number, as represented by a
 pair of numerals, equals one of
 those numerals times a power of an
 implicit fixed positive integer
 base where the power is equal to
 the implicit base raised to the
 exponent represented by the other
 numeral. See 11
 (2) arithmetic, 50-59, 64
 (3) decimal numbers, 202
 (4) double length, 12, 85
 Floating underflow, 51-56, 74, 104
 FMP, 58
 FMPR, 54
 Foreground processing:
 The automatic execution of high
 priority programs that have been
 designed to preempt the use of the
 computing facilities.
 Formats, 167
 Format characters, rules for handling,
 327
 FOR.TMP, 336
 FORTRAN
 (FORMula TRANslating system):
 A language primarily used to ex-
 press computer programs by arith-
 metic formulas.
 FORTRAN IV source programs
 creating or modifying, 493, 497
 FSB, 57
 FSBR, 53
 FSC, 52
 FUDGE2, see File Update Generator
 Full duplex software, 429
 Full word data transmission, 27-32
 Functions, device dependent, 427
 Functions (TENDMP), 621

GET command, 338
 GLOB, see global symbol cross
 reference list
 Global request:
 Request to the Loader to link a
 global symbol to a program. A
 global request points to the
 last reference in the program at
 which the global symbol was used.
 Each reference in the program
 points to the previous reference
 to the requested global. Such a
 chain is terminated by a non-
 relocatable zero address in the
 program. Chained globals are
 restricted to references appearing
 in the address part of a storage
 word. Symbolic references to the
 AC or index fields cannot be
 chained. Locations containing

global symbol references must not
 be loaded into twice, as unpre-
 dictable loader actions may
 result.

Global symbol:
 Any symbol accessible to other
 programs. See 230
 Global symbol cross reference list:
 609-612
 commands, 609, 610
 diagnostic messages, 612
 initialization, 609
 requirements, 609
 switches, 610, 611

Half word data transmission, 20=27
 HALT, instruction, 77, 100, 230
 HALT command, 339, 370
 Handling bytes, 218
 Hardcopy equipment, 123-144
 Hardware:
 Physical equipment, as opposed to
 the computer program or method of
 use, e.g., mechanical, magnetic,
 electrical, or electronic devices
 Contrast with software (2).
 Heuristic:
 Pertaining to exploratory methods
 of problem solving in which solu-
 tions are discovered by evaluation
 of the progress made toward the
 final result. Contrast with
 algorithm.
 High segment:
 (1) In the PDP-10 that segment of
 the user's core which generally
 contains pure code and which can
 be shared by other jobs; usually
 write protected. (e.g., FORTRAN
 compiler).
 (2) Block load into, 249
 HISEG pseudo-op, 312
 HISEG statements, 232
 HLL, 20, 21
 HLLE, 22
 HLLO, 22
 HLLZ, 21
 HLR, 20, 25
 HLRE, 26
 HLRO, 26
 HLRZ, 26
 Hollerith:
 Pertaining to a particular type
 of code or punched card utilizing
 12 rows per column and usually
 80 columns per card.
 HRL, 20, 22
 HRLE, 23
 HRLO, 23
 HRLZ, 23
 HRR, 20, 24
 HRRE, 25
 HRRO, 25
 HRRZ, 24

H switch (Loader), 361

I, 13

IBP, 34, 218

Identification, 378

IDIV, 47

Idle segment:

A sharable high segment which no users in core are using, however, at least one swapped-out user is using, else it would be a dormant segment.

IDPB, 34, 219

IF, 222

IFDIF, 222

IFIDN, 222

ILDB, 34, 218

Immediate mode addressing:

Process through which the right half of a word gives the operand and not the address.

Impure code:

That code which is modified during the course of a run, e.g., data tables.

Impure segment, 99

IMUL, 46

Indefinite repeat, 237

Indexing, 206, 208

Index registers, 9, 13, 14, 15, 16, 27, 79

Indicators, 102

MEMORY STOP, 104

PI ON, 104

PROGRAM STOP, 104

RUN, 103

USER MODE, 104

Indicator panels, 172

Indirect address:

A single instruction address that is at once the address of another address. The second address is the specific address of the data to be processed. If the second address is also an indirect address, it is known as second-level indirect addressing, and so on to other levels.

Indirect addressing, 3, 14, 16, 49, 51, 77, 206

Information retrieval:

The methods and procedures for recovering specific information from stored data.

INIT (UUO), 368

Initialization,

Buffer, 402

Device, 400, 411

Job, 399

Initialize:

To set counters, switches, and addresses to zero or other starting values at the beginning of, or at prescribed points in, a computer routine.

In-out bit assignments, 170

In-out devices, 156, 170

Input-output, see I/O

Input data word formatting, 217

INPUT (UUO), 368

Instruction:

A statement that specifies an operation and the values or locations of its operands. In this context, the term instruction is preferable to the terms command or order which are sometimes used synonymously.

instructions (illegal), 370

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arithmetic testing, 59

byte, 34

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logic, 36

logical testing, 66

move, 29

pushdown, 31, 80

shift, 43, 49

rotate, 43

Instruction flow, 106

Instruction formats, 12-14, 207

input-output, 209

primary, 210

Instruction times, 19

Interactive time-sharing:

Denotes response between the computer system such as the PDP-10 time-sharing system in which many users at Teletypes can develop and execute programs simultaneously.

Interface, hardware options,

to PDP-10 interface, 632

to PDP-10 I/O bus, 632

Interleaving:

To insert segments of one program into another program so that the two programs can, in effect, be executed simultaneously; e.g., a technique used in multi-programming.

Interlock, 64

INTERN, 231

Internal request, 250

Internal symbol:

A symbol generating a global definition which can be used to satisfy all global requests for that symbol. See 230

Interpreter:

A routine such as a Command String Interpreter that translates and stores each source language statement before translating and storing the next one.

Interpretive compiler:

A routine which, as the computation progresses, translates a stored

program expressed in some machine-like pseudo code into machine code and performs the indicated operations, by means of subroutines, as they are translated. (e.g., AID)

Interrupt, 91, 96

- (1) A temporary disruption of the normal operation of a routine by a special signal from the computer, e.g., for I/O purposes.
- (2) channel, 117
- (3) dismissing, 93
- (4) instructions, 94
- (5) requests, 92
- (6) starting, 92

Interrupt enabled, 136

I/O device hardware options,
 card punch, 630
 card reader, 630
 line printer, 630
 plotter, 630

I/O (Input/Output),

- (1) Input or output or both.
- (2) See 78, 86-91
- (3) codes, 157-169
- (4) instruction format, 209

I/O instructions, 369

IOR, 39

IOWD, 219

IR (index register), 8

IRP, 237

IRPC, 238

example, 258

JCRY, 75, 230

JCRYO, 75, 230

JCRYL, 75, 230

JEN, 77, 230

JFCL, 75

JFFO, 74

JFOV, 75, 230

Job:

A specified group of tasks prescribed as a unit of work for a computer. By extension a job usually includes all necessary computer programs, linkages, files and instructions to the Monitor.

See 299, 309

attached mode, 309

detached mode, 309

number check, 312

termination Monitor command,

KJOB, 345

Job data area:

The first 140 octal locations of a user's core area. This area provides storage for items used by both the Monitor and the user program. See page 356

JOBAPR, 358, 376

JOBBLT, 357

JOBCHN, 358

JOBCH6, 357

JOBCHNI, 358, 376

JOBCOR, 358

JOBDA, 359

JOBDDT, 357

JOBERR, 356

JOB41, 356

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JOBREN, 358

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JOBTPC, 358, 376

JOBUSY, 357

JOBUUO, 356

JOBVER, 358

JOV, 75, 230

JRA, 79

JRST, 76, 77, 230

JSA, 79

JSP, 76, 78

JSR, 75, 78

JUMP, 61

Jump:

A departure from the normal sequence of executing instructions, synonymous with transfer (1).

Justify:

(1) To adjust the printing positions of characters on a page so that the lines have the desired length and that both the left and right hand margins are regular.

(2) By extension, to shift the contents of a register so that the most or the least significant digit is at some specified position in the register. Contrast with normalize.

K

(1) An abbreviation for the prefix file, i.e., 1000 in decimal notation.

(2) In automatic data processing, loosely, two to the tenth power, 1024 in decimal notation.

Keys, 105

KJOB command, 345

K switch, 364

Labels, 196, 197

LALL, 226

Latency:

The time delay while waiting for a rotating memory to reach a given location as desired by the user. The average latency is one half the revolution time.

LDB, 34, 218

Leader:

The blank section of tape at the

- beginning of a reel or fanfold of tape.
- Least significant bit, 48
- Library subroutines, 231
 - search mode, 248
- Line Editor for Disk, 499-500
 - commands, 499
 - diagnostic messages, 499
 - initialization, 499
 - Monitor commands, 500
- LINED
 - See Line Editor for Disk
- Line printer:
 - A device that prints all characters of a line as a unit.
 - Contrast with character printer.
- Line printer, 123-131
 - data modes, 440
 - instructions, 125
 - operation, 129
 - output format, 124
 - printing speed, 125
- LINK, 248
- Linking Loader:
 - This routine loads programs into the user's area of memory, properly relocating each one and adjusting addresses to compensate for relocation. It also links (i.e., provides the main program with the correct address of each referenced subprogram, etc.) internal and external symbols to provide communication between independently assembled programs. It also loads subroutines in library search mode. See 245, 248, 526
 - chain feature, 533
 - commands, 527-530
 - diagnostic messages, 534
 - initialization, 527
 - Monitor commands, 536
 - requirements, 526
 - switches, 530-533
- Linking subroutines, 230
- LIST, 226, 247
- LIST command, 323
- List:
 - (1) An ordered set of items.
 - (2) See chained list, pushdown list, pushup list.
 - (3) To printout a listing on the line printer or Teletype.
- Listing control, 225, 226
 - suppression, 225
- List processing:
 - A method of processing data in the form of lists. Usually, chained lists are used so that the logical order of items can be changed without altering their physical locations.
- LIT, 224
- Literals, 206
 - multilined, 207
 - nested, 206
- Load:
 - In programming, to enter data into storage or working registers.
- LOAD command, 325
- Loader:
 - Program which attaches pieces of programs together which may have been created separately previous to the run. See Linking Loader, 360
 - completion of loading, 363
 - H switch, 361
 - loading user programs, 356
 - reentrant, 361
 - switches, 334
- Loading User Programs, 356
- LOC, 211
- Local radix, 215
 - changing, 215
- Location counter, 205, 208, 311
- Logarithm of a complex argument, 256
- Logic, 35
- Logical device name:
 - The name used in ASSIGN commands, 315
- Logical operations, 35-44, 72, 201
- Logical shift, 43, 49, 50
- Logical testing and modification, 65-72
- Logic operator:
 - A logic operator each of whose operands and whose result have one of two values.
- Login:
 - The number and the process with which a user identifies himself to a system. It then accepts him as a valid user and assigns him appropriate system resources.
 - LOGIN, 635. See inside front cover.
 - Login check, 312
 - LOGIN command, 314
 - LOGIN CUSP, 378
- LOGOUT CUSP, 635, 375
 - LOGOUT UUO, 375
- LOOKUP (UUO), 368, 403
- Loop:
 - A sequence of instructions that is executed repeatedly until a terminal condition prevails.
- Low segment:
 - In the PDP-10 that segment of core containing the job data area and I/O buffers, unique and accessible to the user. It is often used to contain the program, but will be used only for data tables, etc. if the user is working with a shared program, such as a system CUSP.
- LPT (line printer), 123, 126
- LSH, 42, 43
- LSHC, 42, 43

- MA (memory address), 8
- Machine language:
A language that is used directly by a machine.
- Machine Mnemonics, 260
- Macro calls, 234, 271
format, 234
nested, 239
- Macro:
An instruction in a source language which is equivalent to a specified sequence of machine instructions.
- Macros
calls, 234, 271
concatenation, 272
created symbols, 235
definition, 233, 271
format, 234
indefinite repeat, 237
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- MACRO-10
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- MACRO-10, entering data, 213
changing local radix, 215
under prevailing radix, 214
- MACRO-10 statements, 195
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- MAC.TMP, 336
- Magnetic Tape, 453, 457
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format, 454
MTAPE, 455
9-channel Magtape, 458
- Magnetic Tape Hardware Options
control, 630
modification kit, 630
units, 630
- MAKE command, 321
- Marginal check:
(1) A preventive maintenance procedure in which certain operating conditions, such as supply voltage or frequency, are varied about their nominal values in order to detect and locate incipient defective parts.
(2) Panel, 103
- Mask:
(1) A pattern of characters that is used to control the retention or elimination of portions of another pattern of characters.
(2) A filter.
(3) 14, C.65-71, 83, 86
- Mass storage:
Secondary storage with a large capacity. On a PDP-10, usually a large disk.
- Matrix:
(1) In mathematics, a two-dimensional rectangular array of quantities. Matrices are manipulated in accordance with the rules of matrix algebra.
(2) In computers, a logic network in the form of an array of input leads and output leads with logic elements connected at some of their intersections.
(3) By extension, an array of any number of dimensions.
- Meddling, 423
- Memory, 14-15
- Memory access time, 15
- Memory allocation, 15
- Memory conservation, 217
- Memory protection:
An arrangement for preventing access to certain areas of storage, e.g., Monitor, for purposes of reading or writing. See 97-100
and allocation, 353
flag, 354
- MEMORY STOP, 104
- Merge:
To combine items from two or more similarly ordered sets into one set that is arranged in the same order.
- Message:
An arbitrary amount of information whose beginning and end are defined or implied
- MI (Memory Indicators), 8
- Mnemonic symbol:
(1) A symbol chosen to assist the human memory, e.g., an abbreviation such as "mpy" for "multiply". See 16, 147
(2) Alphabetic, 152
(3) Derivation, 148
(4) Device, 156
(5) Numeric, 149

Mode:

- (1) A method of operation, e.g., binary mode, interpretive mode, alphanumeric mode.
- (2) The characteristic of a quantity being suitable for integer or for floating point computation.
- (3) Method of card reading and punching, i.e., Hollerith code, which interprets each column as a six-bit alphanumeric character or transcription mode, which interprets each punch as a binary one (1) and each non-punch as a binary zero (0).

Modem (MODulator-DEModulator):

A device that modulates and demodulates signals transmitted over communication facilities.

Modes, 19

- arithmetic testing, 59, 60
- fixed point, 45
- floating point, 50, 52, 56
- half word, 21
- logic, 35, 36, 41
- logical testing, 65
- move, 29
- paper tape punch, 89, 115
- readin, 90, 114
- user, 99

MONEY, 635**Monitor:**

The specific program which schedules and controls the operation of several related or unrelated routines, performs overlapped I/O and allocates resources so that the computer's time is efficiently used. Also provides context switching in 9 time-shared environment. See 99, 101

Monitor command diagnostic messages, 321, 349**Monitor command interpreter, 311****Monitor commands****extended**

- <> construction, 328
- = construction, 328
- + construction, 327
- @ file, 326

functions, 298**interpreter, 302, 304****level, 302, 304****summary, 259**

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Monitor locations, examining, 390**Monitor mode, 310****Monitor operation codes, 371****Monitor UUO's, 367**

restriction in reentrant programs, 368

Move instructions, 28**MOVE, 29, 32****MOVM, 30****MOVN, 29****MOVS, 29****MQ (multiplier-quotient register), 9****MUL, 46****Multiline literals, 207****Multiprocessing:**

Pertaining to the simultaneous execution of two or more computer programs or sequences of instructions by a computer or computer network. Loosely, parallel processing.

Multiprogramming:

- (1) A technique which allows scheduling in such a way that more than one job is in an executable state at one time.
- (2) Disk Monitor, 295
- (3) Non-disk Monitor, 295, 483

Name block, 250**Negative fixed point numbers, 203****Nesting:**

- (1) Including a routine or block of data within a larger routine or block of data.
- (2) Macros, 239, 257
- (3) Subroutines, 80

New symbol, 199**No-Divide, 51, 54, 58, 74, 104****Non-Directory device:**

A device such as mag tape or paper tape which does not contain a file describing the layout of stored data (programs and other files).

Nonexistent memory, 98, 106, 108**Non-Reentrant program**

one segment, 306

two segment, 306, 353

Non-Reentrant system, 296**Non-Sharable segment:**

A segment for which each user has his own copy. Non-sharable segments never have names even if initialized from a file; they may be created by CORE or REMAP UUO.

No-Op:

(1) An instruction that specifically instructs the computer to do nothing, except to proceed to the next instruction in sequence.

(2) 65, 66, 68, 70, 72

Normalization:

(1) This term refers to the positioning of data, left justified with respect to the binary point.

(2) 51, 53, 57, 59, 61

NOSYM, 226**Null character:**

A control character that serves to accomplish media fill or time fill e.g., in USASCII the all zeroes character (not numeric zero).

- Null characters may be inserted into or removed from a sequence of characters without affecting the meaning of the sequence, but control of equipment or the format may be affected. Abbreviated NUL.
- Numbers, 200-205
- arithmetic and logical operations, 203
 - binary shifting, 201
 - evaluating expressions, 204
 - fixed-point decimal, 202
 - floating-point decimal, 202
 - terms, 204
- Number system, 10-12
- Numeric terms, 204
- NXM STOP, 108
-
- Object code:
- (1) Output from a compiler or assembler which is itself executable machine code or is suitable for processing to produce executable machine code.
- Object program:
- (1) The program which is the output of an automatic coding system, usually in machine language ready for execution.
- OCT, 215
- Octal codes, 260
- Octal-to-Decimal conversion, 83
- Offset:
- (1) The number of locations toward zero a program must be moved before it can be executed. (See LDRBLT description in the Monitor manual.) See 361, 363
- One's complement:
- In the binary number system this complement is formed by setting each bit to the opposite value. See 10
- On-Line:
- (1) Pertaining to equipment or devices under direct control of the central processing unit.
 - (2) Pertaining to a user's ability to interact with a computer.
- OP codes, 259
- OPDEF, 228
- Open subroutine:
- A subroutine that must be re-located and inserted into a routine at each place it is used. Synonymous with direct insert subroutine. Contrast with closed subroutine.
- OPEN (UUO), 368
- Operand:
- That which is operated upon. An operand is usually identified by an address part of an instruction.
- See 196
- Operating keys, 105
- CONT, 105
 - DEPOSIT NEXT, 106
 - DEPOST, 106
 - EXAMINE NEXT, 106
 - EXAMINE THIS, 106
 - READ IN, 105
 - RESET, 105
 - XCT, 106
 - START, 105
 - STOP, 105
- Operating instructions (MACRO-10), 273
- procedures, 210
- Operating switches, 107
- FM ENB, 102, 109
 - FP TRP, 109
 - MA TRP OFFSET, 109
 - MI PROG DIS, 108
 - NXM STOP, 108
 - PAR STOP, 108
 - REPT, 108
 - REPT BYP, 108
 - SHIFT CNTR MAINT, 109
 - SING CYCLE, 107
 - SING INST, 107
- Operation
- card reader, 139
 - line printer, 129
 - plotter, 135
 - processor, 103
 - punch, 115
 - reader, 111
 - Teletype, 117
- Operation codes, illegal, 369
- Operator:
- (1) In the description of a process, that which indicates the action to be performed on operands.
 - (2) See unimplemented user operator (UUO), programmed operator.
 - (3) User defined, 228
- OR (See IOR), 39
- ORCA, 39
- ORCB, 40
- ORCM, 40
- Order of expression evaluation, 267
- (TECO), 516
- OUTPUT (UUO), 368
- Overflow:
- That portion of the result of an operation that exceeds the capacity of the intended unit of storage. See 44, 49, 51, 63, 64, 72, 98
- Overlay:
- The technique of repeatedly using the same blocks of internal storage during different stages of a program. When one routine is no longer needed in storage, another routine can replace all or part of it.

Pack:

To compress data in a storage medium by taking advantage of known characteristics of the data in such a way that the original data can be recovered, e.g., to compress data in a storage medium by making use of bit or byte locations that would otherwise go unused.

PAGE, 226**Paper tape punch, 115-117, 439**

data modes, 439
operation, 116
timing, 116

Paper tape reader, 111-115, 438

data modes, 438
operation, 113
readin mode, 114
timing, 112

Parentheses, 206, 233**Parity bit:**

A binary digit appended to an array of bits to make the sum of all the bits always odd or always even.

Parity check:

(1) A check that tests whether the number of ones (or zeroes) in an array of binary digits is odd or even. Synonymous with odd-even check. See 48, 49, 118

Parity error, 94, 107**PAR STOP, 108****Pass:**

One cycle of processing a body of data.

PASS2, 224**Password, 313****Patch:**

To modify a routine in a rough or expedient way.

PC (program counter), 7, 72**Peripheral equipment:**

In a data processing system, any unit of equipment, distinct from the central processing unit, which may provide the system with outside communication.

Peripheral Interchange Program, 585-598

commands, 586
diagnostic messages 592, 593
initialization, 585
Monitor commands, 596
requirements, 585
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Permanent symbols, redefining, 229**PHASE, 213****PI, 91-94, 95, 97****PI ON, 104****PIP, See Peripheral Interchange Program****PIP.TMP, 336****PJOB command, 344****Plotter, 131-135, 474**

data modes, 474
instructions, 133
operation, 135
timing, 134

PLT (Plotter), 133, 134**POINT, 218****Pointer:**

The location containing an address rather than data and which the user plans to use to implement indirect addressing.

(2) Byte, 35
(3) I/O block, 88

POP, 31, 32**POPJ, 81****Postmortem dump:**

A static dump used for debugging purposes; performed at the end of a machine run.

Power failure, 97**Powers of two, 174****Prevailing radix, 214****Primary instruction statement, 208****PRINT, 635****Printer, see "line printer".****PRINTR, 635****PRINTX, 227****Priority interrupt:**

The interrupt that usurps control of the computer program or system and jumps the sequencing to another device, program, program step, or to the device that generates the interrupt signal. See 15, 28, 33, 35, 51, 86, 88, 113

conditions, 94

dismissing an interrupt, 93

interrupt requests, 92

starting an interrupt, 92

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Priority of operations, 204**Processor conditions, 96-98****Processor hardware options**

arithmetic processor, 629
dual memory protection, 629
fast registers, 629
relocation registers, 629

Processor modes, 365**Processor (standard), 330****Processor switches, 333****Program:**

(1) A series of actions proposed in order to achieve a certain result.

(2) To design, write and test a program as in (1).

Program break:

The length of a program; the first location not used by a program (before relocation); the relocation constant for the following

- program (after relocation). See 247
- Program control, 72-81
- Program library:
A collection of available computer programs and routines.
- Programmed operators (UWO's):
PDP-10 instructions which instead of doing computation, cause a jump into the Monitor system at a predetermined point. The Monitor interprets these entries as commands from the user to perform specified operations. See 210, 366
- DECTape, 449
- Programming conventions, 16
- Program origin:
The location assigned by the Loader to relocatable zero of a program. See 361, 363
- Program starting, 369
- PROGRAM STOP, 104
- Project members, 408
- Project-Programmer numbers, 313
- Protected location:
A storage location reserved for special purposes in which data cannot be stored without undergoing a screening procedure to establish suitability for storage therein. See 99
- Protection address, 353, 355
- Protection register, 305, 354
- Pseudo code:
A code that requires further translation prior to execution.
- Pseudo-Op:
(1) An operation that is not part of the computer's operation repertoire as realized by hardware; hence an extension of the set of machine operations.
(2) In MACRO-10, directions for assembly operations.
(3) See 211, 259, 261
- PTP (paper tape punch), 115, 116
- PTR (paper tape reader), 111, 112
- Punch on, 140-143
- Pure code:
Code which is never modified in the process of execution. Hence it is possible to let many users share the same copy of a program. This technique is used by many of the CUSP's. See 99
- PURGE, 224
- PUSH, 31, 32
- Pushdown list:
(1) A list that is constructed and maintained so that the item to be retrieved is the most recently stored item in the list, i.e., last in, first out. See 30, 31
(2) Subroutines containing, 81, 84
- Pushdown overflow, 31, 80, 81, 98, 104
- PUSHJ, 80, 81
- Pushup list:
A list that is constructed and maintained so that the next item to be retrieved and removed is the oldest item still in the list, i.e., first in, first out.
-
- Quantum time, 300
- Queue:
An ordered line waiting for service. See 299
-
- Radix:
In positional representation, that integer, if it exists, by which the significance of the digit place must be multiplied to give the significance of the next higher digit place. For example, in decimal notation, the radix of each place is ten; Synonymous with base. See 200, 213
- RADIX, 213
- RADIX Statement, 213
- RADIX50 statement, 216
- Representation, 270
- Random access:
A device in which the access time is effectively independent of the location of the data. Synonymous with direct access device.
- R Command, 338
- REACT, 635
- READ IN key, 105
- Read-in feature, 25D
- Reading Card, 136, 138
- Readin mode, 90, 114
- Ready to read, 136, 138
- Real time:
(1) Pertaining to the actual time during which a physical process transpires.
(2) Pertaining to the performance of a computation during the actual time that the related physical process transpires in order that results of the computation can be used in guiding the physical process.
- REASSIGN command, 316
- Record:
A collection of related items of data, treated as a unit.
- Redefining macros, 239
- REENTER command, 339
- Reentrant code:
See pure code.
- Re-entrant program:
A two-segment program composed of a sharable and non-sharable segment. See 296, 305, 353, 487
- Reentrant System, 296, 361
- Register, 49

Relative address:

The number that specifies the difference between the absolute address and the base address.

RELEASE programmed operator, 419

RELOC, 211

Relocatable object program, 245, 248

block formats, 249

conventions, 246

Relocate:

In computer programming to move a routine from one portion of storage to another and to adjust the necessary address references so that the routine, in its new location, can be executed. See 99

Relocation address, 353, 355

Relocation before execution, 213

Relocation constant:

The number added to every relocatable reference within a program. The relocation constant is the relocated breakpoint of the previous program. See 246

Relocation Register, 296, 305, 354

REMARK, 227

Remote access:

Pertaining to communication with a data processing facility by one or more stations that are distant from that facility.

Remote station or terminal:

Data terminal equipment for communicating with a data processing system from a location that is time, space, or electrically distant.

RENAME command, 324

RENAME (UUO), 368

REPEAT, 227

Reserving storage, 221

blocks, 221

single location, 221

Response time:

The time which elapses between generation of an inquiry at a terminal and the receipt of a response at the terminal.

Restore, 77

REPT, 108

REPT BYP, 108

RESET, 105

RESOURCES command, 318

Result, 50

RIM format, 252

RIM10 format, 251

RIM10B format, 250, 253, 254

ROT, 42, 43

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ROTC, 42, 44

Rounding, 52, 59

RSW (See DATAI APR), 91, 230

RUN command, 338

Run control Monitor commands,

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HALT, 339

R, 338

REENTER, 339

RUN, 338

SAVE, 340

SSAVE, 341

START, 339

RUN instruction, 103

SAVE command, 340, 341, 368

Scaling, 51

SCHEDULE command, 348

Scheduler:

A section of the Time-Sharing Monitor which determines the sequence of time allotments to users.

Science Library and FORTRAN Utility

Subprograms, 636

Serial access:

(1) Pertaining to the sequential or consecutive transmission of data to or from storage.

(2) Pertaining to the process of obtaining data from, or placing data into, storage where the time required for such access is dependent upon the location of the data most recently obtained or placed in storage. Contrast with random access.

Service routine:

A routine in general support of the operation of a computer, e.g., an input-output, diagnostic, tracing, or monitoring routine. Synonymous with utility routine.

SETA, 36

SETCA, 37

SETCM, 37

SETM, 37

SETO, 36

SETZ, 36

Sharable segment:

A segment which can be used by several users at the same time.

Shared code:

Pure code residing in the high segment of user's core.

Shift:

A movement of data to the right or left.

Shift and rotate, 42, 44, 50, 201

Shuffling, 301

Sign bit:

A binary digit occupying the sign position. See 10, 49

Significance, 51

Simulate:

(1) To represent certain features of

- the behavior of a physical or abstract system by the behavior of another system.
- (2) To represent the functioning of a device, system, or computer program by another, e.g., to represent one computer by another, to represent the behavior of a physical system by the execution of a computer program, to represent a biological system by a mathematical model.
- SIXBIT, 220
- SKIP, 62
- Software:
- A set of computer programs, procedures, rules, and associated documentation concerned with the operation of a data processing system e.g., compilers, monitors, editors, utility programs. Contrast with hardware.
- SOT, 63
- SOS, 64
- Source Compare, 613, 617
- commands, 614
- diagnostic messages, 617
- initialization, 613
- requirements, 613
- switches, 615
- Source language:
- The language from which a statement is translated.
- Source preparation monitor commands
- CREATE, 321
- EDIT, 321
- MAKE, 321
- TECO, 321
- Source program:
- A program written in a symbolic or algebraic language designed for ease of expression.
- Source word, 20
- Square brackets, 206
- SQUOTE, 216
- See RADIX50
- SRCCOM
- See Source Compare
- SSAVE command, 341, 368
- Stack, 635
- START command, 339
- START instruction, 105
- Starting address, 250
- Static dump:
- A dump that is performed at a particular point in time with respect to a machine run, frequently at the end of a run.
- Status bits
- (See entry for individual devices)
- Status checking and setting, 416
- STATUS (UUO), 368
- STOP, 37
- STOP, 105
- STOPI, 238
- Storage device:
- The PDP-10 device used to store named files by the GET, R, or RUN commands. If the file is marked as sharable (extension= "SHR"), the Monitor will give the segment the same name as the file. This is the only way that a segment can be shared.
- Storage
- conserving, 217, 220
- reserving, 221
- Storage allocation (TENDMP), 625
- Storage I/O channel, 297
- SUB, 45
- Subroutines, 78
- entry point, 78
- frequently used, 213
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- linking, 230
- multiple entry, 79, 81
- nesting, 81
- non-reentrant, 78, 100
- two byte unpacking, 257
- SUBTTL, 225
- SVC.TMP, 335
- Swapping:
- The movement of program sections between core and secondary storage.
- I/O channel, 297
- Monitor, 295, 485
- Space, 301
- Storage, 297, 301
- Swapping device:
- Secondary storage suitable for swapping usually a high speed drum or disk.
- Switches, 107
- for compilation listings, 329
- for forced compilation, 332
- for library searches, 332
- for loader maps, 333
- Switches used with monitor commands
- Compile switches, 329
- Loader switches, -34
- Processor switches, 333
- Symbol, 197, 200
- created, 235
- external, 230
- format for block, 249
- global, 230
- internal, 230
- Symbol table, 198, 208
- (1) A dictionary of names used in a program. For example, see MACRO-10.
- (2) direct assignment, 199
- Symbolic address, 197
- (1) An address expressed in symbols convenient to the programmer.
- (2) data reference, 206
- (3) expressions, 216
- (4) operands, 198
- (5) operators, 198
- Symbolic location name, 17
- SYN, 229
- Syntax:

- (1) The structure of expressions in a language.
 - (2) The rules governing the structure of a language.
 - SYS (Device), 387
 - SYSTAT command, 348
 - SYSTAT CUSP, 380, 635
 - System access monitor command
 - LOGIN, 314
 - System administration monitor commands
 - ASSIGN SYS, 348
 - ATTACH dev, 348
 - CTEST, 348
 - DETACH dev, 348
 - SCHEDULE, 348
 - SYSTAT, 348
 - System configuration, 632
 - System timing monitor commands
 - DAYTIME, 346
 - TIME, 346
-
- Table:
- (1) A collection of data in which each item is uniquely identified by a label, by its position relative to the other items, or by some other means.
 - (2) Search technique, 84.
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- Tag:
- One or more characters attached to an item or record for the purpose of identification.
- TALK command, 317
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 - TIME command, 346
- Time quantum:
 - That portion of time given to a specific time shared user.
- Timing,
 - card reader, 138
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 - reader, 112
 - Teletype, 119
- TITLE, 225
- TLC, 68
- TLN, 67
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- TLZ, 67
- Track:
 - The portion of a moving storage medium, such as a drum, tape, or disk, that is accessible to a given reading head position.
- Transfer block, 251
- Trap:
 - An unprogrammed conditional jump to a known location, automatically activated by hardware with the location from which the jump occurrence recorded. See 15
- Trap offset, 98
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- Two's complement arithmetic:
 - Subtraction is performed by means of adding the two's complement of one number to the number it is to be subtracted from. Two's complement is formed by adding one to the one's complement of the given binary number. See 10, 55, 83, 201
- TYPE command, 323

UFA, 55

Unary operators, 201

Underflow:

Pertaining to the condition that arises when a machine computation yields a nonzero result that is smaller than the smallest nonzero quantity that the intended unit of storage is capable of storing. Contrast with overflow.

Unimplemented operations, 15, 82

Update:

A file is updated when opened for reading and writing, one or more blocks are rewritten in place, and the file closed. Only one user may be updating the file at a time.

USASCII (USA Standard Code for Information Interchange):

The standard code, using a coded character set consisting of 7-bit coded characters (* bits including parity check), used for information interchange among data processing communication systems, and associated equipment. The USASCII set consists of control characters and graphic characters. Synonymous with ASCII.

User, 73, 101

User defined operator, 228

User facilities, 1-8, 302

User I/O Mode, 365, 383

User In-out, 74, 86, 96, 98, 100, 101, 104

User Mode:

A hardware defined state of the PDP-10 computed during which all instructions executed normally except that all IO and HALT instructions cause immediate jumps into the Monitor. This makes it possible to prevent the user from interfering with any other user or with the operation of the Monitor. Memory protection and relocation are in effect so that the user can modify only his own area of core. See 104, 310, 353, 365.

User program:

All of the code running under control of the Monitor in an addressing space of its own.

programming, see 100

UUO:

Unimplemented User Operator. See program operator.

Monitor, 367

User, 366

See 15, 82, 304

VAR, 224

Vestigial job data area:

The first 10 octal locations of the high segment used to contain data for initializing certain locations in the job data area. See 362, 343

Virtual core:

That amount of core space which the user appears to be able to use. Usually handled by a program which allows the currently referenced parts of the program to be in core at one time, with additional information being brought off storage as needed. See 302

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MONITOR COMMANDS

NAME	ABBREVIATION	ARGUMENTS				
		1	2	3	4	5
ASSIGN	AS	dev	ldev			
ASSIGN SYS		dev				
ATTACH	AT	dev				
ATTACH	AT	job	proj prog			
CCONT	CC					
COMPILE	COM	list				
CONT	CON	lh	rh	adr		
CORE	COR					
CREATE	CREA					
CREF	CREF	dev				
CSTART	CS	list				
CTEST		list				
D(deposit)	D	dev				
DAYTIME	DA	dev				
DDT	DD	adr				
DEASSIGN	DEA	file	ext			
DEBUG	DEB	list				
DELETE	DEL	dev				
DETACH	DET	dev	file	ext	proj prog	core
DIRECT	DI					
E(examine)	E					
EDIT	ED	list				
EXECUTE	EX	list				
FINISH	F					
GET	G	file	ext			
HALT	↑ C					
KJOB	K	file	ext	core		
LIST	LI	dev	job			
LOAD	LOA					
LOGIN	LOG	arg				
MAKE	M					
PJOB	P	dev	file	ext	proj prog	core
R	R	dev	file	ext	core	
REASSIGN	REA	n				
REENTER	REE	dev	file	ext	core	
RENAME	REN	adr				
RESOURCES	RES					
RUN	RU	core				
SAVE	SA	file	ext			
SCHEDULE	SCH					
SSAVE	SS					
START	ST					
SYSTAT	SYS					
TALK	TA	dev				
TECO	TE	file	ext			
TIME	TI	job				
TYPE	TY	list				

Key:

adr	octal address	lh rh	octal value of left and right half words
core	decimal number of 1K blocks	proj prog	project-programmer numbers
dev	physical device name	list	a single file specification or a string of file specifications
ldev	logical device name		
ext	filename extension	arg	a pair of file specifications or a string of pairs of file specifications
file	filename		
job	job number assigned by Monitor	n	scheduled use of the system.

See Book 3, Chapter 2 for further explanation of commands.

These abbreviations are accurate and unique as of now, but their accuracy and uniqueness may be changed in the future by the addition of new commands.

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CORE	COR					
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CREF	CREF	dev				
CSTART	CS	list				
CTEST		list				
D(deposit)	D	dev				
DAYTIME	DA	dev				
DDT	DD	adr				
DEASSIGN	DEA	file	ext			
DEBUG	DEB	list				
DELETE	DEL	dev				
DETACH	DET	dev	file	ext	proj prog	core
DIRECT	DI					
E(examine)	E					
EDIT	ED	list				
EXECUTE	EX	list				
FINISH	F					
GET	G	file	ext			
HALT	↑ C					
KJOB	K	file	ext	core		
LIST	LI	dev	job			
LOAD	LOA					
LOGIN	LOG	arg				
MAKE	M					
PJOB	P	dev	file	ext	proj prog	core
R	R	dev	file	ext	core	
REASSIGN	REA	n				
REENTER	REE	dev	file	ext	core	
RENAME	REN	adr				
RESOURCES	RES					
RUN	RU	core				
SAVE	SA	file	ext			
SCHEDULE	SCH					
SSAVE	SS					
START	ST					
SYSTAT	SYS					
TALK	TA	dev				
TECO	TE	file	ext			
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